BEST AVAILABLE COPY

92-1934

MOTION FILED
JUN 7 1993

No. 92-

IN THE

Supreme Court of the United States

OCTOBER TERM, 1992

J.M., INDIVIDUALLY,

Petitioner,

- against -

V.C., [redacted],

Respondent.

BRIEF IN SUPPORT OF PETITION FOR CERTIORARI TO SUPREME COURT OF NEW JERSEY AND MOTION FOR LEAVE TO FILE AMICI BRIEF

WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE; AMERICAN ACADEMY OF MEDICAL ETHICS; AMERICAN LIFE LEAGUE, INC.; CANADIAN PHYSICIANS FOR LIFE; CATHOLIC ASSOCIATION OF SCIENTISTS AND ENGINEERS; DENTISTS FOR LIFE; INTERNATIONAL RIGHT TO LIFE FEDERATION; LIFE ISSUES INSTITUTE, INC.; NATIONAL ASSOCIATION OF PRO-LIFE NURSES; NATIONAL FEDERATION OF CATHOLIC PHYSICIANS' GUILDS; PHARMACISTS FOR LIFE; PHILADELPHIA CATHOLIC PHYSICIANS GUILD; PHILIPPINE ASSOCIATION OF FAMILY PHYSICIANS IN AMERICA; SCIENTISTS FOR LIFE; THE GUILD OF ST. LUKE, S.S. COSMAS & DAMIAN; AND NEW ZEALAND DOCTORS FOR LIFE AS AMICI CURIAE IN SUPPORT OF PETITION

GIL D. MESSINA, ESQ.
Counsel of Record
MESSINA & LAFFEY
219 Broad Street
Red Bank, New Jersey 07701
(908) 219-6677
Attorneys for Amici Curiae

MOTION FOR LEAVE TO FILE AMICUS CURIAE BRIEF

The amicus curiae, World Federation of Doctors Who Respect Human Life; American Academy of Medical Ethics; American Life League, Inc.; Canadian Physicians For Life; Catholic Association of Scientists and Engineers; Dentists for Life; International Right to Life Federation; Life Issues Institute, Inc.; National Association of Pro-Life Nurses; National Federation of Catholic Physicians' Guilds; Pharmacists for Life; Philadelphia Catholic Physicians Guild; Philippine Association of Family Physicians In America; Scientists for Life; The Guild of St. Luke, S.S. Cosmas & Damian; and New Zealand Doctors for Life hereby move the court for leave to file an amici curiae brief in support of the petitioner, J.M. Counsel for petitioner consents to the filing of the brief, but counsel for Respondent, V.C. declined consent.

TABLE OF CONTENTS

MOTION FOR LEAVE TO FILE AMICUS CURIAE BRIEF i

TABLE OF AUTHORITIES iii

INTEREST OF AMICI 1

SUMMARY OF ARGUMENT 7

ARGUMENT 8

I. THE LIFE OF A CHILD BEGINS AT CONCEPTION. THE NUMEROUS AND SIGNIFICANT SCIENTIFIC DISCOVERIES SINCE *ROE V. WADE* SUPPORT THIS CONCLUSION. THERE NOW EXISTS A CONSENSUS IN SCIENCE AND MEDICINE CONCERNING THE FACTS WHICH FORM THE BASIS FOR THIS CONCLUSION. THIS COURT SHOULD GRANT THE WRIT TO DECIDE WHEN LIFE BEGINS AND THE RIGHTS OF THE CHILD. 8

A. Introduction 8

B. The Life of Each Person Begins at Conception. 11

II. BASED ON NEW SCIENTIFIC AND MEDICAL INFORMATION A CHILD EXPERIENCES PAIN DURING ABORTION EVEN AS EARLY AS EIGHT WEEKS AFTER CONCEPTION. 23

A. The New Technology 23

B. Assumptions About Pain. 28

C. The Need to Relieve Pain During Fetal Surgery. 30

D. Non Myelinated Nerve Fibers Transmit Pain. 32

E. It is Now Known that Full Cortical Development Is Not Necessary for the Child to Experience and Respond to Pain Prior to Birth. 34

CONCLUSION 42

TABLE OF AUTHORITIES

SCIENTIFIC AND MEDICAL AUTHORITIES:

Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329 . . . . . 32, 38

Anthony C.P.; and Kolthoff, N.J. *Textbook of Anatomy and Physiology* 9th ed. St. Louis: the C.V. Mosby Company, 197514

Arnheim, N.; and Levenson, C.H. 1990. "Polymerase Chain Reaction." *Chemical & Engineering News* (Oct. 1990): 36-47, at p. 36. 11

Arnheim, N.; White, T.; and Rainey, W. "Application of PCR: "Organismal and Population Biology." *Bioscience* 40(1990):174-182, at p. 174. 11

Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brain Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239 . . . . . 40, 41

Audesirk, G.; and Audesink, T. *Biology: Life on Earth*. 2nd ed. New York: Macmillian Publishing Company, 1989 14

Ballesta, J.; Bloom, S.R.; and Polak, J.M. "Distribution and Localization of Regulatory Peptides." *Crit Rev Clin Lab Sci* 22(1985):185-218, at pp. 185-186. 25

Bernard, H.W. *Human Development in Western Culture* 4th ed. Boston: Allyn & Bacon, Inc., 1975. 14

Bernstein, R. and Bernstein, S. *Biology: The Study of Life*. New York: Harcourt Brace Jovanovick, Inc., 1982 . . . . . 13, 14

Boehm, C.D. and Kazazian, H.H. Jr., "Prenatal Diagnosis by DNA Analysis" In *The Unborn Patient* 2nd ed., edited by Michael R. Harrison et al., 82-91 at 82. Philadelphia: W.B. Saunders Company, (1991) 20

Boreus, L.O. "Pain in the Newborn - Pharmacodynamic Aspects." Dev. Pharmacol Ther 15(1990): 142-148 34

Bryant, N.J. *Disputed Paternity*. New York: Brian C. Decker, a Division of Thieme-Stratton, Inc., 1980 14

Campbell, A.M. "Monoclonal Antibody Technology" In *Laboratory Techniques and Biochemistry and Molecular Biology*, edited by R.H. Burdon and P.H. Van Knippenberg. Eisevier (Amsterdam), 1985 ..... 9, 24

Casey, K.L. "Neural Mechanisms of Pain: An Overview." *Acta Anaesthesiol Scand* Suppl 74(1982): 13-20 32

Chaillet, J.R.; Vogt, T.F.; Beier, D.R.; and Leder, P. "Parental-Specific Methylation of an Imprinted Transgene is Established During Gamestogenesis and Progressively Changes During Embryogenesis." *Cell* 66(1991): 77-83 18

Clark, J. ed. *The Nervous System: Circuits of Communication In The Human Body*. Torstar Books, Inc., 1985. .. 14, 25, 32, 33

Clark, J.; ed. *Genetics and Heredity: The Blueprints of Life*, In *The Human Body*. Torstar Books, Inc., 1985 14

Clark, J.; ed. *Growth and Development: The Span of Life In The Human Body*. Torstar Books, Inc., 1985 14

Cole, S.C.P.; Campling, B.G.; Atlaw, T.; Kozbor, D.; Roder, J.C. "Human Monoclonal Antibodies." *Mol Cell Biochem* 62 (1984): 109-120, at p. 109. 24

Craig, G. *Human Development* 4th ed. Englewood Cliffs, NJ: Prentice-Hall, 1986 14

Crouch, J.E. *Functional Human Anatomy* 4th ed. Philadelphia: Lea & Febiger, 1985 14

de Vries, J.I.P.; Visser, G.H.A.; and Prechtl, H.F.R. "The Emergence of Fetal Behavior. I. Qualitative Aspects." *Early Hum Dev* 7(1982): 301-322 41

DeCoursey, R.M. *The Human Organism* 4th ed. McGraw-Hill, Inc., 1974. 14

Filly, R.A. "Sonographic Anatomy of the Noraml Fetus" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison et al., 92-130, Philadelphia: W.B. Saunders Co., 1991 38

Fischbach, G.D. "An Introduction to Molecular Approaches in Studies of Neuronal Development and Synapse Formation." In *Molecular Neurobiology* In *Neurology and Psychiatry*, edited by M.D. Erich, R. Kandel. New York: Raven Press, 1987. 25

Fitzgerald, H.E.; Strommen, E.A.; and McKinney, J.P. *Developmental Psychology: The Infant and Young Child.* Homewood, IL: The Dorsey Press, 1977 14

Fitzgerald, M.; and McIntosh, N. "Pain and Analgesia in the Newborn." *Arch Dis Child* 64(1989): 441-443 29

Fletcher, A.B. "Pain in the Neonate." *N Eng J Med* 317(1987): 1347-1348 30

Flower, M.J. "Neomaturation of the Human Fetus." *J Med & Phil* 10(1985): 237-251 . . . . . 39, 41

Gilbert, S.F. *Development Biology*. Sunderland, MA: Sinauer Associates, Inc., 1985 . . . . . 13, 14, 18

Goin, C.J.; and Goin, O.B. *Man and the Natural World* 2nd ed. New York: Macmillan Publishing Co., Inc., 1975 14

Goldenring, J.M. "Development of the Fetal Brain." *N Engl J Med* 307(1982): 564 . . . . . 15, 39

Handyside, A.H.; Pattinson, J.K.; Penketh, R.J.A.; Delhanty, J.D.A.; Winston, R.M.L.; and Toddenham, E.G.D. "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification." *Lancet* I (1989):347-349. . . . . 11, 21

Harlock, E.B. *Child Development* 6th ed. McGraw-Hill, Inc., 1978 15

Harrison, M.; and Adzick, N.S. "The Fetus as a Patient." *Ann Sur* 213(1991): 279-291 . . . . . 28, 32

Harrison, M.R.; Adzick, N.S.; Longuker, M.T.; Goldberg, J.D.; Rosen, M.A.; Filly, R.H.; Evans, M.I.; and Golbos, M.S. "Successful Repair in Utero of a Fetal Diaphragmatic Hernia After Removal of Herniated Viscera from the Left Thorax." *N Eng J Med* 322(1990): 1582-1584 31

Harrison, M.R.; Golbus, M.S.; Filly, R.A.; Anderson, R.L.; Flake, A.W.; Rosen, M.; and Huff, R.W. "Fetal Hydronephrosis: Selection and Surgical Repair." *J Pediatr Surg* 22(1987): 556-558 . 31

Harrison, M.R.; Langer, J.C.; Adzick, N.S.; Golbus, M.S.; Filly, R.A.; Anderson, R.L.; Rosen, M.A.; Callen, P.W.; Goldstein, R.G.; and deLorimier, A.A. "Correction of Congenital Diaphragmatic Hernia In Utero, V. Initial Clinical Experience." J Pediatric Surg 25(1990):47-57. 28

Hogge, W. A. "Chorionic Villus Sampling" In *The Unborn Patient* 2nd ed. edited by M.R. Harrison et al., 53-57. Philadelphia: W.B. Saunders Co., 1991 . . . . . 20, 21

Holding, C.; and Monk, M. "Diagnosis of Beta-Thalassaemia by DNA Amplification in Single Blastomeres from Mouse Preimplantation Embryos." *Lancet* II (1989): 532-535. . . . 11

Honma, M., et al. *Application of DNA Fingerprinting to Parentage and Extended Family Relationship Testing*, Human heredity, 1990, 40: 19

Jeffreys, A.J., et al., *Principles and Recent Advances of Human DNA Fingerprinting*; DNA Fingerprinting: Approaches and Applications, edited by Jeffreys (1991) 19

Jeffreys, A.J.; Brookfield, J.F.Y; and Semeonoff, R. "Positive Identification of an Immigration Test-Case Using Human DNA Fingerprints." *Nature* 317 (1985):818-819 19

Jeffreys, et al. *DNA Fingerprints and Segregation Analysis of Multiple Markers in Human Pedigrees*, Am. Journal of Human Genetics, 39:11-24 (1986) 19

Jennett, S. *Human Physiology*. New York: Churchill Livingstone, 1989 15

Kaluger, G.; and Kaluger, M. *Human Development: The Span of Life*. St. Louis: The C.V. Mosby Company, 1974. 15

Kalvger, G.; and Kalvger, M.F. Human Development: *The Span of Life*. St. Louis: The C.V. Mosby Company, 1974 39

Kovacs, B.W.; Shahbahrami, B.; Medearis, A.L.; and Comings, D.E. "Prenatal Determinations of Paternity by Molecular Genetic "Fingerprinting." *Obstet Gynecol* 75(1990): 474-478 19

Lagercrantz, H.; and Forssberg, H. "Functional Development of the Brain in the Fetus and the Infant." *Lakartidningen* 88(1991): 1880-1885 37

Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32 . . . . . 27, 31, 32

Longaker, M.T.; Golbus, M.S.; Filly, R.A.; Rosen, M.A.; Chang, S.W.; and Harrison, M.R. "Maternal Outcome After Open Fetal Surgery." *JAMA* 265(1991) 31

Lugo, J.O.; and Hershey, G.L. *Human Development: A Multi-Disciplinary Approach to the Psychology of Individual Growth*. New York: Macmillan Publishing Co., Inc., 1974 . . . . . 12, 15

Luo, C.B.; Zheng, D.R.; Guan, Y.L.; and Yew, D.T. "Localization of Substance P and Enkephalin by Immuno histochemistry in the Spinal Cord of the Human Fetus." *Neuroscience* 27(1988): 989-993 36

Mader, S.S. *Inquiry into Life*. Dobuque, Iowa: Wm. C. Brown Company Publishers, 1976. Munsinger, H. *Fundamentals of Child Development* 2nd ed. New York: Holt, Rinehart, and Winston, Inc., 1975. 15

Marin-Padilla, M. "Structural Organization of the Human Cerebral Cortex Prior to the Appearance of the Cortical Plate." *Anat Embryol* 166(1983): 21-40 36

Martinis, J.; David, G.S.; Bartholomew, R.M.; and Wang, R. "Novel Applications of Monoclonal Antibodies." In *Basic Biology of New Development* In *Biotechnology* In *Basic Life Sciences* 25(1983): 129-154. . . . . 9, 24

Monk, M.; and Holding, C. "Amplification of a Beta-Haemoglobin Sequence in Individual Human Oocytes and Polar Bodies." *Lancet* 335(1990): 885-987, at 985. 22

Moore K. *Before We Are Born*, 3rd ed. Philadelphia: WB Saunders Co. 1989. . . . . 13, 14, 15, 16

Mussen, P.H.; Conger, J.J.; and Kagan, J. *Child Development and Personality* 5th ed. New York: Harper & Row, 1979. . . 12, 15

Nelson, G.E. *Biological Principles with Human Applications* 3rd ed. New York: John Wiley & Sons, 1989 15

O'Neill, C. "A Consideration of the Factors Which Influence and Control the Viability and Developmental Potential of the Preimplantation Embryo." *Baillieres Clin Obstet Gynaecol* 5(1991): 159-178. 22

Oppenheimer, S.B., et al. *Introduction to Embryonic Development*, 1989, Allyn and Bacon; Editorial Production Service, Lifland, et al. Bookmakers 13

Oppenheimer, S.B.; and Lefeure, G. Jr. *Introduction to Embryonic Development* Allyn and Bacon 1989. 20

Papalia, D.E.; and Okls, S.W. *A Child's World: Infancy Through Adolescence*. New York: McGraw-Hill, Inc., 1979 20

Parker, S. *Life Before Birth: The Story of the First Nine Months*. Cambridge: Cambridge University press, 1979. 15

Paulin, C.; Charnay, Y.; Chayvialle, J.A.; Daniere, S.; and Dubois, P.M. "Ontogeny of Substance P in the Digestive Tract, Spinal Cord and Hypothalamus of the Human Fetus." *Regul Pept* 14(1986): 145-153 35

Pikunas, J. *Human Development: An Emergent Science*. McGraw-Hill, Inc., 1976. 15

Porter, F. "Pain in a Newborn," *Neonatal Neurology, Clinics in Neonatology*, 16(2) p. 549 et seq. (1989) 28

Price, J.O.; Elias, S.; Wachtel, S.S.; Klinger, K.; Dockter, M.; Tharapel, A.; Schulman, L.P.; Phillips, O.P.; Meyers, C.M.; Schook, D.; and Simpson, J.L. "Prenatal Diagnosis with Fetal Cells Isolated From Maternal Blood by Multiparameter Flow Cymetry" *Am J Obstet Gynecol* 165(1990): 1731-1737 . . . . . 19, 20

Report on Human life Bill, Subcommittee on Separation of Powers, Committee on the Judiciary United States Senate (97th Cong., 1st Sess. 1981). 23

Rizvi, T.; Wadhwa, S.; and Bijiani, V. "Development of Spinal Substrate for Nociception" *Pain 4(1987-suppl.): S195* 38
Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991 . . . . . 31, 32

Rosen, M.A., *Anesthesia for Procedures Involving the Fetus* (1991), Seminars in Perinatology 15:410-417. 30

Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-333 . . . . . 30, 33

Rosen, M.A. "Anesthesia for Procedures Involving the Fetus." *Semin Perinatol* 15(1991): 410-417 30

Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-333 30

Scarr, S.; Weinberg, R.A.; and Levine A. *Understanding Development*. Harcourt Brace Jovanovich, Inc., 1986 15

Schuster, S.h.; and Asburn, S.S. *The Process of Human Development: A Holistic Life-Span Approach* 2nd ed. Boston: Little, Brown, and Company, 1986. 15

Shewman, D.A.; Capron, A.M.; Peacock, W.J.; and Schulman, B.L. "The Use of Anencephalic Infants as Organ Sources: A Critique." *JAMA* 261(1989): 1773-1781 40

Strand, F.L. *Physiology: A Regulatory Systems Approach*. New York: Macmillan Publishing Company, Inc., 1978. 15

Strickland, R.A.; Oliver, W.C.; Chantigian, R.C.; Ney, J.A.; and Davidson, G.K. "Anesthesia, Cardiopulmonary Bypass, and the Pregnant Patient." *Mayo Clin Proc* 66(1991): 411-429 28, 31

Stumpf, D.A., Chair of Medical Task Force on Anencephaly "The Infant With Anencephaly." *N Eng J Med* 322(1990): 669-674 40

Surani, M.A.H.; Barton, S.C.; and Norris, M.L. "Nuclear Transplantation in the Mouse: Heritable Differences Between Paternal Genomes after Activation of the Embryotic Genome." *Cell* 45(1986): 127-136 18

Sussman, L.N. *Paternity Testing By Blood Grouping*. Springfield, IL: Charles C. Thomas Publisher, 1976. 15

Swain, J.L.; Stewart, T.A.; and Leder, P. "Parental Legacy Determines Methylation and Expression of a Cutosomal Transgene; A Molecular Mechanism for Paternal Imprinting." *Cell* 50(1987):719-727 18

Tam, P.K.; and Lister, J. "Maldevelopment of Spinal Cord - Substance P in Spina Bifida." *Z Kinderchir* 41(1986): 206-208 35

Telford, N.A.; Watson, A.J.; and Schultz, G.A. "Transition From Maternal to Embryonic Control in Early Manmalian Development: A Comparison of Several Species." Molecular Reproduction and Development 26(1990): 90-100. 23

The Medical Task Force on Anencephaly, (Stumpf, D.A., et al.) "The Infant with Anencephaly" *N Eng J Med* 322(1990): 669-674 39

Thibodeau, G. *Anatomy and Physiology*. St. Louis: Times Mirror/Mosby College Publishing, 1987. . . . . 12, 15

Thibodeau, G.A.; and Anthony, C.P. *Structure and Function of the Body* 8th ed. St. Louis: Times Mirror/Mosby College Publishers, 1988. . . . . 13, 15

Turner, J.S.; and Helms, D.B. *Lifespan Developmental* 2nd ed. CBS College Publishing (Hold, Rinehart, and Winston), 1983 14, 15

Uddman, R.; Edvinsson, L.; Jansen, I.; Stiernholm, P.; Jensen, K.; Olesen, J.; and Sunder, F. "Peptide-Containing Nerve Fibers in Human Extracranial Tissue: A Morphological Basis for Neuropeptide Involvement in Extracranial Pain?" *Pain* 27(1986): 391-399 36

Van Assche, F.A. "Anencephalics as Organ Donors." *Am J Obstet Gynecol* 163(1990): 599-600. 40

Volpe, E.P. *Biology and Human Concerns* 3rd ed. Dobuque, Iowa: Wm. C. Brown Company Publishers, 1983. 15

Volpe, E.P., *Seeds of Life, In Biology and Human Concerns* (1983), Stout, J., 3rd Ed. Wm. C. Brown Co. 13

Wadhwa, S.; Rizvi, T.A.; and Bijiani, V. "Substance P-Immunoreactivity in the Developing Human Retinogeniculate Pathway." *Neurosci Lett* 89(1988): 25-30 35

Wall, P.D. "The Biological Function and Dysfunction of Different Pain Mechanisms." In *Advances in Pain Research and Therapy*. Edited by F. Sicuteri, (10:19-28). New York: Raven Press, 1992 33

Watson, J.D.; Tooze, J.; and Kurtz, D.T. *Recombinant DNA: A Short Course*. San Francisco: W.H. Freman, 1983. 9

White, T.J.; Arnheim, N.; and Erlich, H.A. "The Polymerase Chain Reaction." *Trends Genet* 5(1989): 185-189, at p. 185. . . . 11

Yew, D.T., et. al. *Development and Localization of Enkephalin and Substance P in the Neucleus of the Tractus Solitarius in the Medulla Oblongata of Human Fetuses*, Neuroscience, 1990, 34 to p.491-8 35

In The

Supreme Court Of The United States

OCTOBER TERM, 1992

No. 92-

J.M., individually
Petitioner

v.

V.C., *et al.*,
Respondents

INTEREST OF AMICI

WORLD FEDERATION OF DOCTORS WHO RESPECT HUMAN LIFE

This federation is truly worldwide, boasting a membership of 350,000 physicians from 65 nations. The federation has a constituent membership of 75 member organizations from around the world, including Doctors for Life which is headquartered in St. Louis, Missouri. WFDRHL is headquartered in Ostend, Belgium and has executives and regional coordinators around the world.

One of the main purposes of WFDRHL is to promote appropriate respect for human life among members of the world medical community. WFDRHL's members subscribe to the principles that from the moment of fertilization, a human being is alive and entirely distinct from the mother who provides nourishment and protection; that from fertilization to old age, it is the same human being who grows old, develops, matures, and eventually dies; that each human being is unique and therefore irreplaceable; that medicine should have absolute respect for human life regardless of age, illness, disability or degree of dependence and it should serve life from its beginning as well as when it is failing; that when a physician is confronted with a tragic situation, the doctor's duty is to do everything possible to help both the mother and her child; and that the killing an unborn human for social, economic or eugenic reasons is directly contradictory to the role of the doctor.

AMERICAN ACADEMY OF MEDICAL ETHICS

AAME was incorporated in Indiana in 1986 and has a membership of 22,000 physicians in all fields of medicine throughout the United States and Canada.

AAME is dedicated to the sanctity and defense of human life from conception until natural death and seeks to return American medicine to the original principles of the Hippocratic Oath. AAME is engaged in supporting appropriate legislative action, education and training and conducts seminars and produces and disseminates medical publications.

AMERICAN LIFE LEAGUE, INC.

ALL was incorporated in Virginia in 1979. It has a membership comprised of 250,000 families from across the United States.

ALL works to achieve an American society in which all human life is respected and protected from fertilization until natural death. It helps form public policies that respect and protect all human beings, born and unborn. ALL informs and educates Americans on pro-life issues. It produces media and legislative tools, including books, pamphlets, position papers, briefs, model legislation and produces a weekly one-half hour national television program.

CANADIAN PHYSICIANS FOR LIFE

CPL is a federally incorporated Canadian corporation which maintains its offices in Ontario, Canada. CPL was formed in 1975 and has an approximate membership of 1,000 physicians which membership is drawn throughout Canada.

CPL is a secular, non-denominational organization whose principal purposes include providing leadership and education by and to physicians who believe in the sanctity and defense of human life from the moment of conception until natural death. CPL's goal is to reach out to Canadian physicians who share a common belief regarding the sanctity of human life.

CATHOLIC ASSOCIATION OF SCIENTISTS AND ENGINEERS

CASE was formed in Maryland on May 13, 1992, when it was incorporated. The association is comprised of scientists, physicists and engineers from different parts of the United States.

CASE is dedicated to the sanctity and defense of human life from the moment of conception until natural death and CASE is committed to apply its scientific and technological skills in support of this principle.

DENTISTS FOR LIFE

DFL was organized in 1988 in Pennsylvania. Its purpose is to foster the sanctity and defense of human life from the moment of conception until natural death and DFL is committed to the application of medical and technological skills in support of these principles. DFL is strongly opposed to abortion, euthanasia and infanticide. DFL is an American Life League affiliate.

DFL, which is comprised of approximately 50 dentists from 15 chapters across the United States, initiates pro-life activities in their communities and the organization provides free dental services and education to pregnant women. DFL raises no money and accepts no donations.

INTERNATIONAL RIGHT TO LIFE FEDERATION

IRTLF is a non-denominational, non-partisan, international educational group which was organized approximately 10 years ago. It has its main office in Rome, Italy.

IRTLF's principal function is to promote education and communication between the various national right to life groups throughout the world. IRTLF sponsors an average of two to four educational congresses annually. Its two most recent congresses were held in Lithuania and Moscow in October 1992 and additional meetings will be held soon in Central America, India and Australia.

IRTLF's board is comprised of delegates from Canada, the United States, South America, Africa, the sub-continent of India, Australia, Japan, Eastern Europe and two delegates from Western Europe. IRTLF has Non-Governmental Organization status in the

United Nations and is regularly represented in Geneva, Switzerland on issues pertaining to respect for human life. IRTLF's representative also engages in lobbying the European Parliament in Strasbourg, France.

John C. Willke, M.D., the federation's president, has authored nine books in the field of human sexuality and abortion, including Handbook on Abortion, which is the most widely read book in the world presenting the scientific case for the unborn. It has been translated into 22 languages. Dr. Willke has appeared on virtually every television show in the United States where abortion has been a topic and conducts a daily radio program which is carried by almost 300 radio stations.

LIFE ISSUES INSTITUTE, INC.

LII is a corporation that has been in existence for more than 18 years. It has operated under its current name for two years. LII has a governing body of five members who are from Maine, Iowa, Indiana and two from Ohio.

LII is an educational foundation whose goals include the development of a broad-based national effort to stimulate and guide a renewal of pro-life education throughout the United States. Its mission is to assure equal protection under the law for all human beings from the beginning of their biological lives at fertilization until natural death. LII functions as a "think tank" to accomplish its mission. In addition to LII's usual educational activities, LII supports a daily commentary on life issues which is presented on almost 300 radio stations nationwide.

NATIONAL ASSOCIATION OF PRO-LIFE NURSES

NAPLN was organized in 1973 and subsequently incorporated in 1979 in Minnesota.

This organization is dedicated to the sanctity of human life from conception until natural death and works to unite nurses who seek to achieve excellence in nurturing and caring for the unborn, new born, the ill and dying. NAPLN members adhere to a code of ethical standards governing their role in caring for patients' lives.

NAPLN provides educational programs and disseminates information on medical and legal issues pertaining to the nursing profession. It supports research which is beneficial to humanity and the preservation of human life at all stages of development.

NAPLN's membership approximates 1,000 registered and licensed practical nurses, both active and retired and nursing students from across the United States.

NATIONAL FEDERATION OF CATHOLIC PHYSICIANS' GUILDS

NFCPG is a federation headquartered in Elm Grove, Wisconsin, which is comprised of Catholic Physicians Guilds from across the United States. It currently has a membership of approximately 6,000 physicians.

Among NFCPG's purposes is to provide an organization of physicians and dentists who can provide leadership based upon their knowledge, skill and experience in the medical field, including leadership concerning important medical and ethical issues of the day. NFCPG also promulgates concepts of medical ethics among the medical profession in general and in society at large.

NFCPG believes and submits that the scientific evidence clearly supports the view that the life of each individual begins at conception.

PHARMACISTS FOR LIFE

PFL was incorporated in Ohio in 1984. It has a membership of more than 1,000 pharmacists and scientists which is drawn from across the United States and from every continent in the world.

PFL supports the sanctity and defense of human life from the moment of conception until natural death and works to achieve these goals through the application of its members' scientific, medical and technological skills. PFL conducts educational programs and scientific research by and for pharmacists, scientists and other health professionals, as well as the general public.

PHILADELPHIA CATHOLIC PHYSICIANS GUILD

PCPG was organized more than 20 years ago in Philadelphia, Pennsylvania. It is the largest Catholic physicians group in the country with hundreds of members from the Delaware Valley area.

PCPG informs and assists the Cardinal of the Philadelphia Catholic Archdiocese and renders assistance to charitable organizations. PCPG gives aid and assistance to the homeless, it runs clinics for homeless women and for children. PCPG members lecture at high schools on the subjects of abortion and euthanasia, both of which practices PCPG opposes.

PHILIPPINE ASSOCIATION OF FAMILY PHYSICIANS IN AMERICA

PAFPA was incorporated in Michigan in 1990. It is comprised of family physicians of Philippine descent from across the United States. It currently has a membership of approximately 130.

PAFPA promotes the practice of medicine by family physicians and is committed to the principle that human life begins at conception. PAFPA disseminates information on matters relating to family practice, including those advocating the pro-life position.

SCIENTISTS FOR LIFE

SFL was incorpoated in Ohio in 1991.

SFL is an organization comprised of persons with professional degrees in the sciences, including medicine, with a national membership of approximately 150, plus several European members. SFL publishes a quarterly newsletter which is sent to about 300 readers.

The principal purpose of SFL is to educate people and disseminate scientific information concerning life issues, including abortion and euthanasia, two practices to which SFL is opposed.

THE GUILD OF ST. LUKE, S.S. COSMAS & DAMIAN

GSL is an unincorporated guild of Catholic doctors, organized in Wellington, New Zealand in 1954.

GSL's purposes include the promotion of the spiritual and intellectual welfare of Catholic Medical Practitioners, to study and discuss medical problems, especially those of a moral, ethical, philosophical and spiritual nature, and to uphold the moral law in the practice of medicine.

GSL engages in the formation of study groups to investigate ethical issues and to prepare submissions for the legislature. Members participate on spiritual retreats and in social gatherings to support and strengthen the stand on moral issues.

NEW ZEALAND DOCTORS FOR LIFE

New Zealand Doctors for Life was organized in 1981 by a group of physicians who believe that taking life, no matter how old, how young, or how apparently useless, is foreign to the nature of medicine. The Doctors for Life aim to: (1) practice and promote ethical medicine as described by the Declaration of Geneva of the World Medical Association 1948; (2) educate and encourage the medical profession and society at large regarding our professional responsibility towards humanity; (3) to further legal protection for all members of the human race, both born and unborn; and (4) to promote scientific, social and economic measures which will facilitate the practice of ethical medicine.

SUMMARY OF ARGUMENT

A Writ of Certiorari should be granted in this case because the enormous amount of new scientific information obtained in the past five to ten years makes it clear that their can be no doubt that the child is a human being before birth and from the moment of conception. An explosion of scientific technology has totally revolutionized how mankind obtains knowledge concerning the unique identity, completeness and the development of the child

from conception to birth. Science now learns on a molecular level which has proven many of the assumptions made at the time of *Roe v. Wade* (based upon the primitive methodology of that era) to be totally false.

It is now known that children can experience pain during surgical abortions as early as eight weeks after conception. The old assumptions concerning how human beings feel pain must totally discarded. These revelations require a determination, now, that the child is a human being from conception because abortion is the painful death of a human being.

ARGUMENT

I. THE LIFE OF A CHILD BEGINS AT CONCEPTION. THE NUMEROUS AND SIGNIFICANT SCIENTIFIC DISCOVERIES SINCE *ROE V. WADE* SUPPORT THIS CONCLUSION. THERE NOW EXISTS A CONSENSUS IN SCIENCE AND MEDICINE CONCERNING THE FACTS WHICH FORM THE BASIS FOR THIS CONCLUSION. THIS COURT SHOULD GRANT THE WRIT TO DECIDE WHEN LIFE BEGINS AND THE RIGHTS OF THE CHILD.

A. Introduction

Since the Supreme Court's decision in *Roe v. Wade* in 1973, there has been an explosion in scientific technology which has fundamentally altered the capability and manner in which science acquires knowledge of human development. These recent advancements mean science can now investigate human development at

the molecular level, using recombinant DNA technology[1] and monoclonal antibody technology,[2] if the instructions (made up of DNA and RNA) to make a particular protein exist and also if that instruction has been transcribed (read). Today, science can determine if a specific protein has indeed been produced from specific genetic instruction.[3] These scientific techniques, combined with immunochemistry technology, can be used to show that a particular protein is present in a specific sample; and when this is combined with an appropriate visualization technique, the location of the protein in the sample can be determined.[4] In 1973 most of our knowledge concerning human identity and development before birth was based upon gross morphological observations. Mankind did not have the capability we have today to

[1] Watson, J.D.; Tooze, J.; and Kurtz, D.T. *Recombinant DNA: A Short Course*. San Francisco: W.H. Freman, 1983.

[2] Campbell, A.M. "Monoclonal Antibody Technology" In *Laboratory Techniques and Biochemistry and Molecular Biology*, edited by R.H. Burdon and P.H. Van Knippenberg. Eisevier (Amsterdam), 1985.

[3] Martinis, J.; David, G.S.; Bartholomew, R.M.; and Wang, R. "Novel Applications of Monoclonal Antibodies." In *Basic Biology of New Development* In *Biotechnology* In *Basic Life Sciences* 25(1983): 129-154, at p. 129.

[4] Since the *Roe* Court commented upon the then current knowledge of mankind in 1973, there have been many scientific, medical and technological discoveries, some very recent. These have been adequately set forth and described in J.M.'s petition filed with the court (see, Pet. at 18-19).

examine and study on a molecular level. In 1973 a scientist would observe a physical structure such as the cerebral cortex or dendritic spines, and when that structure was not present or was removed, the scientist would observe what appeared to happen (the visual result). Today we can learn what is occuring in human development before we can see specific structures develop. Scientists can now look at a human's building blocks, the proteins and instructions that control the proteins, so they view not only what develops at a molecular level, but when it develops. On a macroscopic level, the new technology of ultrasound and its application to the study of the child in utero (in the womb) has accommodated observation of, with unprecedented clarity, the child and how he or she reacts to its environment. Advances in electroencephalography have allowed for the early detection of brain wave activity in the fetus. The results of these investigations demonstrate the level of ignorance concerning the child in 1973. Today we understand that there were incorrect assumptions at that time concerning the child's existence as a unique human being from conception, his or her development from conception to old age, and the child's ability to react to its environment and to feel pain prior to birth.

The origin and extensive use of the molecular biological techniques since 1973 have dramatically changed the way in which modern biology is conducted. By using DNA probe technology, combined with the Southern Hybridization technique, for example, scientists are able to detect the presence or absence of a specific genetic code or instruction in a sample of tissue. When DNA probe techniques are combined with polymerase chain reaction (PCR)[5] it is possible to identify the presence of a specific genetic code material in a sample as small as one cell[6]. The technology can determine genetic uniqueness, research genetic diseases, and observe human development at a molecular level, as never before. This is done through the analysis of human genes.

B. The Life of Each Person Begins at Conception.

[5] Arnheim, N.; and Levenson, C.H. 1990. "Polymerase Chain Reaction." *Chemical & Engineering News* (Oct. 1990): 36-47, at p. 36. White, T.J.; Arnheim, N.; and Erlich, H.A. "The Polymerase Chain Reaction." *Trends Genet* 5(1989): 185-189, at p. 185. Arnheim, N.; White, T.; and Rainey, W. "Application of PCR: "Organismal and Population Biology." *Bioscience* 40(1990):174-182, at p. 174.

[6] Holding, C.; and Monk, M. "Diagnosis of Beta-Thalassaemia by DNA Amplification in Single Blastomeres from Mouse Preimplantation Embryos." *Lancet* II (1989): 532-535. Handyside, A.H.; Pattinson, J.K.; Penketh, R.J.A.; Delhanty, J.D.A.; Winston, R.M.L.; and Toddenham, E.G.D. "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification." *Lancet* I (1989):347-349.

The life of a human being begins at the moment of conception when the sperm of a father penetrates inside the mother's ovum and all of the genetic material and information for the complete development of a unique individual human being is present. The information carried by the father encounters in the same recipient cell the information transmitted by the mother so that suddenly, almost instantaneously, a new constitution is spelled out in genetic terms and everything that is necessary to be a human being is present immediately after conception.[7] Either all the necessary gene-

[7] Gilbert, S.F., *Developmental Biology*, Sinauer Ass. Inc., 1985, p.32-37, 58-63; Lugo, J.O.; and Hershey, G.L. *Human Development: A Multi-Disciplinary Approach to the Psychology of Individual Growth*. New York: Macmillan Publishing Co., Inc., 1974. "The growth of every human being begins with a special cell, the fertilized ovum. Although the diameter of the ovum is approximaely 1/175 of an inch and its weight is about one 20 millionth of an ounce, all the genetic potentialities for the complete development of a human being are contained within it. From this microscopically small cell, a baby composed of about 200 billion cells of different kinds will develop during the next nine months. This striking phenomenon of growth is common in all human beings." p. 242; Mussen, P.H.; Conger, J.J.; and Kagan, J. *Child Development and Personality* 5th ed. New York: Harper & Row, 1979. "The life of each individual begins when a sperm cell from the father penetrates the wall of an ovum, or egg, from the mother." p. 52. "Life begins at conception. But what of the forces that, throughout the individual's existence, will influence his or her development? When do they begin? The answer, again, is at conception. At the moment that the tiny tadpole-shgaped sperm penetrates the wall of the ovum, it releases 23 minute particles called chromosomes. At approximately the same time, the nucleus, the inner core of the ovum, breaks up, releasing 23 chromosomes of its own." pp. 52-53. "This process is of great interest to us because it has been established through painstaking research that these chromosomes, which are further subdividied into even smaller particles called genes, are the carriers of the child's heredity. All the child's biological heritage from the father and mother is contained in these 46 chromosomes." p. 53. Thibodeau, G. *Anatomy and Physiology*. St. Louis: Times Mirror/Mosby College Publishing, 1987. "Half of the 46 chromosomes in the zygote nucleus have come

tic information is present for conception of a human being for development to full stages of human growth (after the moment of the entry of the sperm into the ovum) or the genetic information is insufficient, conception will fail and no human being shall exist.[8] Not only is it possible to identify this first cell after conception as being human, the individual entity is complete and can be identi-

from the sperm and half from the ovum. Since chromosomes are composed of genes, the new being inherits half of its genes and the characteristics they determine form its father and half from its mother. Genetically, the zygote is complete. Time and nourishment are all that is needed for expression of those characteristics such as sex, body build, and skin color that were determined at fertlization." Thibodeau, G.A.; and Anthony, C.P. *Structure and Function of the Body* 8th ed. St. Louis: Times Mirror/Mosby College Publishers, 1988. "The science of the development of the individual before birth is called embryology. It is a story of miracles, describing the means by which a new human life is started and the steps by which a single microscopic cell is transformed into a complex human being." pp. 409-410. "Genetically the zygote is complete. It represents a new single celled individual." Moore K. *Before We Are Born*, 3rd ed. Philadelphia: WB Saunders Co. 1989. "Human development begins at fertlization when a male gamete or sperm fuses with a female gamete or ovum to form a zygote. The zygote is the first cell of a new human being." p. 25. The record in this case contains some reliable testimony of Dr. Jerome LeJeune on this and other points. His description of the genetic phenomina is of assistance to the Court in understanding the events and developments on this point, see, LeJeune, at A-97 to A-99. See also, the numerous authorities found following petition at A-19 to A-30.

[8] Volpe, E.P., *Seeds of Life, In Biology and Human Concerns* (1983), Stout, J., 3rd Ed. Wm. C. Brown Co., p.18-20; Gilbert, S.F., *Developmental Biology*, Sinauer Ass. Inc., 1985, p.32-37, 58-63; Oppenheimer, S.B., et al. *Introduction to Embryonic Development*, 1989, Allyn and Bacon; Editorial Production Service, Lifland, et al. Bookmakers, p.20-60; Bernstein, R. et al. *Biology: The Study of Life* (1982), Harcorth, Brace, Jocvanovick, Inc. p. 584. See, also, LeJeune at 97.

fied.[9] This new constitution is complete. There is without doubt a complete, separate, identifiable human being immediately after conception.[10]

[9] Moore, K. *Before We Are Born*, 3rd ed. Philadelphia W.B. Saunders Company 1989. "Fusion of the two haploid gametes or germ cells (each with 23 chromosomes) produce a zygote, which is a diploid cell with 46 chromosomes, the normal number for the human species." p. 26. Turner, J.S.; and Helms, D.B. Lifespan Developmental 2nd ed. CBS College Publishing (Hold, Rinehart, and Winston), 1983. "Yet far more remarkable than the birth itself is the process whereby a single fertilized egg develops into a fully functioning infant - complete with arms, legs, nose, eyes, ears, internal organs, and an individuality all of its own. The key to this magnificent story is a special code contained in the nucleus of a cell. This code, unique and different for every individual, is just now becoming understood by scientists." p. 52 "Each species of plant and animal and every individual wihtin a species has a full set of directions locked inside its nucleus. This is what makes a mouse different from a bird, a flower different from a tree, and siblings different from each other." p. 52. Clark, J.; ed. *Genetics and Heredity: The Blueprints of Life*, In *The Human Body*. Torstar Books, Inc., 1985. "You are unique because the combination of your genes is unique, and nobody has exactly the same combination (evenif you are an identical twin - although between such twins there are only subtle differences). Genes provide the fundamental information that determines how a person develops, although environmental acts to shape the final product from the moment of conception onward."

[10] Moore, *supra*, 26-28; Volpe, *supra*, 18-20. Anthony C.P.; and Kolthoff, N.J. *Textbook of Anatomy and Physiology* 9th ed. St. Louis: the C.V. Mosby Company, 1975. Audesirk, G.; and Audesink, T. *Biology: Life on Earth*. 2nd ed. New York: Macmillian Publishing Company, 1989. Bernard, H.W. *Human Development in Western Culture* 4th ed. Boston: Allyn & Bacon, Inc., 1975. Bernstein, R. and Bernstein, S. *Biology: The Study of Life*. New York: Harcourt Brace Jovanovick, Inc., 1982. Bryant, N.J. *Disputed Paternity*. New York: Brian C. Decker, a Division of Thieme-Stratton, Inc., 1980. Clark, J. ed. *The Nervous System: Circuits of Communication In The Human Body*. Torstar Books, Inc., 1985. Clark, J.; ed. *Growth and Development: The Span of Life In The Human Body*. Torstar Books, Inc., 1985. Clark, J.; ed. *Genetics and Heredity: The Blueprints of Life*, In *The Human Body*. Torstar Books, Inc., 1985. Craig, G. *Human Development* 4th ed. Englewood Cliffs, NJ: Prentice-Hall, 1986. Crouch, J.E. *Functional Human Anatomy* 4th ed. Philadelphia: Lea & Febiger, 1985. DeCoursey, R.M. *The Human Organism* 4th ed. McGraw-Hill, Inc., 1974. Fitzgerald, H.E.; Strommen, E.A.; and McKinney, J.P. *Developmental Psychology: The Infant and Young Child*. Homewood, IL: The Dorsey Press, 1977. Gilbert, S.F. *Development Biology*. Sunderland, MA: Sinauer Associates, Inc., 1985. Goin,

Within the process of fertilization is an extraordinary device employed by nature to protect the privacy of the life of the person immediately after conception. The egg, a little sphere of one and one-half millimeters in diameter is protected by a transparent membrane (the zona pellucida) which completely covers the egg. Immediately upon a single sperm burrowing inside the zona pellucida, the transparent membrane suddenly becomes physically

C.J.; and Goin, O.B. *Man and the Natural World* 2nd ed. New York: Macmillan Publishing Co., Inc., 1975. Goldenring, J.M. *Development of the Fetal Brain*. 307 The New England Journal of Medicine 564(1982). Harlock, E.B. *Child Development* 6th ed. McGraw-Hill, Inc., 1978. Jennett, S. *Human Physiology*. New York: Churchill Livingstone, 1989. Kaluger, G.; and Kaluger, M. *Human Development: The Span of Life*. St. Louis: The C.V. Mosby Company, 1974. Lugo, J.O.; and Hershey, G.L. *Human Development: A Multi-Disciplinary Approach to the Psychology of Individual Growth*. New York: Macmillan Publishing Co., Inc., 1974. Mader, S.S. *Inquiry into Life*. Dobuque, Iowa: Wm. C. Brown Company Publishers, 1976. Moore, K. *Before We Are Born* 3rd ed. Philadelphia: W.B. Saunders Company, 1989. Munsinger, H. *Fundamentals of Child Development* 2nd ed. New York: Holt, Rinehart, and Winston, Inc., 1975. Mussen, P.H.; Conger, J.J.; and Kagan, J. *Child Development and Personality* 5th ed. New York: Harper & Row, 1979. Nelson, G.E. *Biological Principles with Human Applications* 3rd ed. New York: John Wiley & Sons, 1989. Parker, S. *Life Before Birth: The Story of the First Nine Months*. Cambridge: Cambridge University press, 1979. Pikunas, J. *Human Development: An Emergent Science*. McGraw-Hill, Inc., 1976. Scarr, S.; Weinberg, R.A.; and Levine A. *Understanding Development*. Harcourt Brace Jovanovich, Inc., 1986. Schuster, S.h.; and Asburn, S.S. *The Process of Human Development: A Holistic Life-Span Approach* 2nd ed. Boston: Little, Brown, and Company, 1986. Strand, F.L. *Physiology: A Regulatory Systems Approach*. New York: Macmillan Publishing Company, Inc., 1978. Sussman, L.N. *Paternity Testing By Blood Grouping*. Springfield, IL: Charles C. Thomas Publisher, 1976. Thibodeau, G.A.; and Anthony, C.P. *Structure and Function of the Body* 8th ed. St. Louis: Times Mirror/Mosby College Publishers, 1988. Thibodeau, G. *Anatomy and Physiology*. St. Louis: Times Mirror/Mosby College Publishing, 1987. Turner, J.S.; and Helms, D.B. *Lifespan Developmental* 2nd ed. CBS College Publishing (Hold, Rinehart, and Winston), 1983. Volpe, E.P. *Biology and Human Concerns* 3rd ed. Dobuque, Iowa: Wm. C. Brown Company Publishers, 1983.

changed and within microseconds becomes completely impenetrable by any other sperm.[11]

The necessary genetic information to create a human being is created in DNA. Petitioner's genetic expert provides a useful description of this information: physically, it is analogous to a minute flat ribbon of tape that is used in a tape recorder. Inside the head of a sperm is a long thread of one meter or so which is so tightly coiled in twenty-three little pieces that the whole of its volume can be put on the point of a needle. It contains twenty-three chromosomes. The ovum also contains twenty three chromosomes.

The interaction of the biological components can be analogized to the process of a tape recorder which plays music. When a mini cassette on which the music of an artist such as Mozart is recorded and placed into a tape recorder, one experiences the sound of a symphony. The tape itself has no notes or music, and there are no musicians. Because there is a special code written on the tape, information is conveyed in such a way that the tape recorder will read it and make air move through a loud speaker. What is experienced by a listener is not an orchestra, not musicians, not evi-

[11] *Moore*, supra, at 25.

dence of music, but the genius of the author. That is how life is played: inside the egg which receives the tape band from the father which has its own tape bands, there forms a sort of table or law of life. Within the egg is a tremendous amount of information to be received and interpreted. The genetic information necessary to form the completed human being is not only the long ribbon of DNA (which through the analogy is the mini cassettes of the symphony), but information in the cell itself, which reads it. The cell is an analogous to the magnetiscope of the tape recorder and possesses within it enormous information.[12]

Methylation of cytosine, discovered about five years ago, supports the conclusion that a human being is a complete person upon conception. It was discovered that DNA contains basic information like a program which instructs specific development of the human being, so that some development is programmed to take place immediately, other development at specific stages later. Every single stage of growth is programmed at conception, but

[12] See, LeJeune, petitioner's appendix A-98 to A-100.

only manifests itself as the program is read.[13] This is a significant and new understanding that science could never have anticipated at the time of *Roe v. Wade*. It removes doubt about the nature and completeness of the person at conception.

Other developments in technology have resulted in discoveries which support the conclusion that a human being is genetically complete at the moment of conception.

In ~~1896~~ 1986 science discovered and developed a technique which can determine the identity of a specific human being. The technique, known as genetic fingerprinting extracts DNA, examines it and records unique traits of the individual being examined. The genetic fingerprinting establishes the uniqueness and identity of

[13] Chaillet, J.R.; Vogt, T.F.; Beier, D.R.; and Leder, P. "Parental-Specific Methylation of an Imprinted Transgene is Established During Gamestogenesis and Progressively Changes During Embryogenesis." *Cell* 66(1991): 77-83. Surani, M.A.H.; Barton, S.C.; and Norris, M.L. "Nuclear Transplantation in the Mouse: Heritable Differences Between Paternal Genomes after Activation of the Embryotic Genome." *Cell* 45(1986): 127-136. Swain, J.L.; Stewart, T.A.; and Leder, P. "Parental Legacy Determines Methylation and Expression of a Cutosomal Transgene; A Molecular Mechanism for Paternal Imprinting." *Cell* 50(1987):719-727, at p. 719. Gilbert, S.F. ***Developmental Biology*** Sunderland, Mass.: Sinaver Associates Inc., 1985, at p. 61. Petitioner provides a helpful development of methylation. See, Pet. at 21 to 22.

each person from the earliest stages of the person's life after conception.[14]

The technologies of molecular biology have recently begun to find application in the detection of fetal abnormalities and fetal sex determinations through the analysis of the very small number of fetal cells that have found their way into the mother's bloodstream (about 1 cell in 10 to 100 million blood cells of the mother).[15] Using cell sorting technology (another post 1973 development) and DNA probe technology, scientists have been able to determine, for example, the presence of a growing boy or girl from a sample of

[14] Jeffreys, et al. *DNA Fingerprints and Segregation Analysis of Multiple Markers in Human Pedigrees*, Am. Journal of Human Genetics, 39:11-24 (1986); Honma, M., et al. *Application of DNA Fingerprinting to Parentage and Extended Family Relationship Testing*, Human heredity, 1990, 40:p356-362; Jeffreys, A.J., et al., *Principles and Recent Advances of Human DNA Fingerprinting*; DNA Fingerprinting: Approaches and Applications, edited by Jeffreys (1991). Jeffreys, A.J.; Brookfield, J.F.Y; and Semeonoff, R. "Positive Identification of an Immigration Test-Case Using Human DNA Fingerprints." *Nature* 317 (1985):818-819, at pp. 818-819. Honma, M.; and Ishiyama, I. "Application of DNA Fingerprinting to Parentage and Extended Family Relationship Testing." *Hum Hered* 40(1990): 356-362, at p. 356. Kovacs, B.W.; Shahbahrami, B.; Medearis, A.L.; and Comings, D.E. "Prenatal Determinations of Paternity by Molecular Genetic "Fingerprinting." *Obstet Gynecol* 75(1990): 474-478, at pp. 474-475.

[15] Price, J.O.; Elias, S.; Wachtel, S.S.; Klinger, K.; Dockter, M.; Tharapel, A.; Schulman, L.P.; Phillips, O.P.; Meyers, C.M.; Schook, D.; and Simpson, J.L. "Prenatal Diagnosis with Fetal Cells Isolated From Maternal Blood by Multiparameter Flow Cymetry" *Am J Obstet Gynecol* 165(1990): 1731-1737, at p. 1731.

4 ml of the mother's blood.[16]It is an established principle of human genetics and heredity that an individual human's cells all contain the same DNA composition (except for sperm and ovum cells)[17] so that the few fetal cells that have found their way into the mother's bloodstream demonstrate the presence of the unique human existing separately in the mother's womb.

The ability to detect genetic disorders before birth has improved dramatically during the last two decades.[18] The application of deoxyribonucleic acid (DNA) techniques to prenatal diagnosis of certain single gene disorders was first introduced in 1976.[19]

Another major advancement has been the use of chorionic villus sampling. It was only in 1982 that its potential use in determining

[16] Price, J.O.; Elias, S.; Wachtel, S.S.; Klinger, K.; Dockter, M.; Tharapel, A.; Schulman, L.P.; Phillips, O.P.; Meyers, C.M.; Schook, D.; and Simpson, J.L. "Prenatal Diagnosis with Fetal Cells Isolated From Maternal Blood by Multiparameter Flow Cytometry" *Am J Obstet Gynecol* 165(1990): 1731-1737, at p. 1731.

[17] Oppenheimer, S.B.; and Lefeure, G. Jr. *Introduction to Embryonic Development* Allyn and Bacon 1989. (pp. 20-60) at p. 53. Papalia, D.E.; and Okls, S.W. *A Child's World: Infancy Through Adolescence*. New York: McGraw-Hill, Inc., 1979, at p. 51.

[18] Hogge, W. A. "Chorionic Villus Sampling" In *The Unborn Patient* 2nd ed. edited by M.R. Harrison et al., 53-57. Philadelphia: W.B. Saunders Co., 1991, at p. 53.

[19] Boehm, C.D. and Kazazian, H.H. Jr., "Prenatal Diagnosis by DNA Analysis" In *The Unborn Patient* 2nd ed., edited by Michael R. Harrison et al., 82-91 at 82. Philadelphia: W.B. Saunders Company, (1991).

genetic disorders was realized. Due to the fact that trophoblastic tissue has the same "genetic constitution" as the fetus, a sample from the chorionic villi reflects the chromosomal, biochemical, and DNA status of the fetus. Therefore, the production of trophoblastic tissue is controlled by the DNA of the developing child and not that of the mother. This procedure uses tissue collected in the first trimester of life.[20]

The techniques involved in the generation of "in vitro" fertilization demonstrate that the child is a unique human being from conception. Before implantation the new human being is clearly separate from its mother. During the period after fertilization and before implantation, it has been possible to determine the sex of the child, whose development is started by a clear physical separation from the mother and father.[21] The preimplantation diagnosis of certain genetic diseases has also been considered a feas-

[20] Hogge, W.A. "Chorionic Villus Sampling" In *The Unborn Patient* 2nd ed. edited by M.R. Harrison et al., 53-57. Philadelphia: W.B. Saunders Co., 1991, at p. 53.

[21] Handyside, A.H.; Pattinson, J.K.; Penketh, R.J.A.; Delhanty, J.D.A.; Winston, R.M.L.; and Toddenham, E.G.D. 1989. "Biopsy of Human Preimplantation Embryos and Sexing by DNA Amplification." *Lancet* I (1989):347-349, at p. 348.

ible medical advance.[22] These procedures support the conclusion that pre-implanted human embryo is a genetically unique and complete human being.

The goal in the study of human embryo viability in synthetic culture medium is improved development and pregnancy success. Recently an embryo derived platelet activating factor was discovered, which when added to growth media, has dramatically increased the developmental and pregnancy potential of the embryo.[23] This chemical, a product of the new human, supports the conclusion that, even before implantation, there is an independent, unique human capable of producing substances that enhance its own survival.

The "fetus" is not "part of" a "woman's body." If it were the mother's body would control the child's genetic growth and development. Using modern molecular biology technology, not available in the 1970's, it has been found that by the third cell division

[22] Monk, M.; and Holding, C. "Amplification of a Beta-Haemoglobin Sequence in Individual Human Oocytes and Polar Bodies." *Lancet* 335(1990): 885-987, at 985.

[23] O'Neill, C. "A Consideration of the Factors Which Influence and Control the Viability and Developmental Potential of the Preimplantation Embryo." *Baillieres Clin Obstet Gynaecol* 5(1991): 159-178.

after fertilization control of growth and development has been established by the new human's DNA.[24]

In 1981 the Subcommittee on Separation of Powers of the Judiciary Committee of the United States Senate conducted extensive hearings on the question of when life began based upon the knowledge of science at that time. The committee concluded:

> ...Life of a human being begins at conception ... today the facts are beyond dispute ... physicians, biologists and other scientists argue that conception marks the beginning of the life of a human being ... there is overwhelming agreement on this point in countless medical, biological, and scientific writings.[25]

There simply is no credible evidence to refute this conclusion.

II. BASED ON NEW SCIENTIFIC AND MEDICAL INFORMATION A CHILD EXPERIENCES PAIN DURING ABORTION EVEN AS EARLY AS EIGHT WEEKS AFTER CONCEPTION.

Studies being conducted as a result of the availability of new technology has resulted in data and information which supports the conclusion that the unborn child is subjected to great pain during an abortion, and the child experiences pain as early as eight weeks after conception.

A. The New Technology

[24] Telford, N.A.; Watson, A.J.; and Schultz, G.A. "Transition From Maternal to Embryonic Control in Early Manmalian Development: A Comparison of Several Species." Molecular Reproduction and Development 26(1990): 90-100, at 92.

[25] Report on Human life Bill, Subcommittee on Separation of Powers, Committee on the Judiciary United States Senate (97th Cong., 1st Sess. 1981) p. 7.

Development of techniques of monoclonal antibody production, first described in 1975 using mouse material and then further developed to allow the production of specific human antibodies in the early 1980's[26], has complemented DNA and RNA studies which are the subject of Molecular Biology, by allowing for the specific detection and location of individual proteins or peptides in a human cell sample.

The use of monoclonal antibody technology[27], as well as recent developments in modern protein chemistry and electrophysiology, are being applied to questions relevant to human developmental neurobiology. Initially applied in the mid 1980's, the new techniques was recognized as having the potential to revolutionize our understanding of the human nervous system at it's inception. Scientists recognized that with the new technology they could investigate nervous system function and development at the molecular or chemical level, no longer limited to observations of the

[26] Martinis, J.; David, G.S.; Bartholomew, R.M.; and Wang, R. "Novel Applications of Monoclonal Antibodies." In *Basic Biology of New Development* In *Biotechnology* In *Basic Life Sciences* 25(1983): 129-154, at pp. 129-130. Cole, S.C.P.; Campling, B.G.; Atlaw, T.; Kozbor, D.; Roder, J.C. "Human Monoclonal Antibodies." *Mol Cell Biochem* 62 (1984): 109-120, at p. 109.

[27] Campbell, A.M. "Monoclonal Antibody Technology" In *Laboratory Techniques and Biochemistry and Molecular Biology*, edited by R.H. Burdon and P.H. Van Knippenberg. Eisevier (Amsterdam), 1985

histological presence of nerves and other gross functionality. From the start this technological application showed that the classical histological and functional criteria for defining (nerve) cell types was oversimplified.[28]

One result was the detection of some 30 neuropeptides (or nerve hormones) directly involved in the functioning nervous system of the human body. The presence of peptides (the hormones) of the endocrine system were known in 1973; but since 1973 similar substances have been found to be present in nerve fibers. This discovery was described in 1985 as a recent and revolutionary discovery.[29] These neuropeptides function as neurotransmitters and neuromodulators which are located at axon terminals at synapses throughout human tissue. Two important neuropeptides are substance P (the chemical messenger of pain) and enkephalin (a neurotransmitter involved in pain perception).[30] The detection of

[28] Fischbach, G.D. "An Introduction to Molecular Approaches in Studies of Neuronal Development and Synapse Formation." In *Molecular Neurobiology* In *Neurology and Psychiatry*, edited by M.D. Erich, R. Kandel. New York: Raven Press, 1987.

[29] Ballesta, J.; Bloom, S.R.; and Polak, J.M. "Distribution and Localization of Regulatory Peptides." *Crit Rev Clin Lab Sci* 22(1985):185-218, at pp. 185-186.

[30] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body*. Torstar Books, Inc., 1985, at pp. 152-154.

these two neuropeptides in samples of human tissue has been used as a convenient way to define and locate nervous system development and function in the human being from the time of conception. In 1985, the study of neuropeptides was still in its infancy. Due to accelerated pace of study however, it disclosed a very complex process of interacting peptides, neurons, and ion channels which play an important role in the detection and transmission of sensation in the human. Their discovery was a direct result of new immunocytochemical techniques used in conjunction with radioimmunoassay, neither of which were available in the 1970's.

The crude ultrasound devices that were available in the early 1970's permitted limited access to knowledge of a child during the early stages of growth. "Real time ultrasound" was developed in 1976 and actually created a motion picture which could depict movement and function such as breathing, urination, swallowing and other functions of the human existence. This level of visualization permits diagnosis of the child's illnesses while in its mother's womb. Medicine can now watch how the child functions including such intricate detail as the operation of the tiny little valves of the heart as it flops up and down pushing blood.

Abnormalities in things such as heart valves can be detected and rather sophisticated operations are currently performed on unborn children at four to five months.[31]

First pioneered in 1981, fetal surgery has made dramatic advances. During fetal surgery, both mother and child are anesthetized, the mother's abdomen surgically opened and the uterus incisioned. While still attached to the umbilical cord, amniotic fluid is drained off, and "the surgeon removes the fetus' left arm from the uterus and attaches specially designed fetal monitors."[32] These fetal monitors are for ECG, transcutaneous oxygenation, and temperature readings. The baby is incised surgically, repaired, and is placed back into the mother's uterus. The uterus is filled with warm lactated Ringer's solution and prophylactic antibiotics to replace any lost amniotic fluid.[33] Fetal heart rate and oxygen saturation monitoring is a norm in these

[31] See, Nathanson at A-121 to A-122.

[32] Levine, A.H. "Fetal Surgery." *Aorn*, 54(1991): 17-19, 22-27, 30-32, at p. 30.

[33] Levine, A.H. "Fetal Surgery." *Aorn*, 54(1991): 17-19, 22-27, 30-32, at p. 30. Nathanson at 52a.

procedures.[34] Some defects that might require this procedure include urethral obstruction, congenital diaphragmatic hernia, fetal chylothorax, sacrococcygeal teratoma (a fetal tumor).[35] After surgery, the child can proceed through pregnancy to, at, or near full term.[36] During the fetal surgery the baby is treated like an adult patient, and must be anesthetized.

B. Assumptions About Pain.

Since the time of *Roe v. Wade* there have been a number of generally accepted assumptions about human neurological development and our ability to feel pain that have been refuted. The first assumption was that neonates were incapable of feeling pain.[37] The second assumption was that myelinated nerve fibers were necessary for pain perception, and since they did not form completely until after birth pain perception was a late develop-

[34] Harrison, M.R.; Langer, J.C.; Adzick, N.S.; Golbus, M.S.; Filly, R.A.; Anderson, R.L.; Rosen, M.A.; Callen, P.W.; Goldstein, R.G.; and deLorimier, A.A. "Correction of Congenital Diaphragmatic Hernia In Utero, V. Initial Clinical Experience." J Pediatric Surg 25(1990):47-57, at p. 49.

[35] Harrison, M.; and Adzick, N.S. "The Fetus as a Patient." *Ann Sur* 213(1991): 279-291, at p. 281.

[36] Strickland, R.A.; Oliver, W.C.; Chantigian, R.C.; Ney, J.A.; and Davidson, G.K. "Anesthesia, Cardiopulmonary Bypass, and the Pregnant Patient." *Mayo Clin Proc* 66(1991): 411-429, at p. 413. Nathanson at 46a.

[37] Porter, F. "Pain in a Newborn," *Neonatal Neurology, Clinics in Neonatology*, 16(2) p. 549 et seq. (1989).

mental event. The third assumption was that pain experience required pain detecting nerves connected to the thalamus and then to the brain cortex; there was presumed to be a period of cortical maturation necessary before pain could be experienced. All of these assumptions were based upon gross histological observations. Those making such assumptions did not know about neuropeptides, their detection and function. They also did not have available the modern methodologies and techniques developed in the last decade.

Only recently has it been understood that even normal neonates feel pain.[38] At the time of *Roe*, had been assumed by the medical community that a fully developed and mature cortical brain region was necessary for pain perception. This assumption, it became clear, was inconsistent with the observations of those who cared for premature infants.[39]

[38] Fitzgerald, M.; and McIntosh, N. "Pain and Analgesia in the Newborn." *Arch Dis Child* 64(1989): 441-443, at p. 441.

[39] One of whom stated eloquently,

"It has generally been assumed that the ability of a child to feel pain increases with age and that neonates may not perceive pain or may perceive it only minimally. Assumed by whom? Certainly not by those of us at the bedside of critically ill infants, who see them flinch from procedures, startle in response to loud noises, and turn from bright lights and various other forms of stimulation. Not by those who have heard infants' anguished cries and seen their vigorous withdrawals from painful stimuli. Not by those who have observed their increased heart and respiratory rates and profuse sweating in

Biochemical studies supported the observations of care givers concerning pain experiences. Studies on unborn and premature infants showed much earlier developmental time when pain was experienced. Detailed hormonal studies in preterm neonates undergoing surgery under minimal anesthesia have shown marked release of catecholamines, as well as autonomic nervous stimulation, heart rate changes, increased hormonal activity and increased motor activity. These activities are consistent with stress experienced with pain.[40] It has been documented that endocrine and metabolic responses associated with pain are abolished by giving anesthesia to preterm neonates[41], and to the fetus.[42]

C. The Need to Relieve Pain During Fetal Surgery.

response to heel sticks or circumcision. And finally, not by those who have seen babies gasp for every breath as they die from incurable lung disease." Fletcher, A.B. "Pain in the Neonate." *N Eng J Med* 317(1987): 1347-1348, at p. 1347.

[40] Rosen, M.A., *Anesthesia for Procedures Involving the Fetus* (1991), Seminars in Perinatology 15:410-417.

[41] Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-333, at p. 320. Rosen, M.A. "Anesthesia for Procedures Involving the Fetus." *Semin Perinatol* 15(1991): 410-417, at p. 431.

[42] Levine, A.H. (1991), Fetal Surgery, *Aorn J*, V54(1): 16-19, 22-27, 30-32, at p. 27. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., (1991), Harrison (editors), W.B. Saunders Co. p. 176, at p. 176.

Since 1981, the field of fetal surgery developed dramatically. It is common practice to monitor fetal vital signs and to give the fetus anesthesia.[43] "Although the mother is anesthetized for fetal surgery, the fetus becomes the prime target for the anesthesia."[44] "For fetal surgery, unlike maternal surgery, the fetus is not an innocent bystander for whom we attempt the least anesthetic interference. Instead, the fetus is the primary patient, requiring safe administration of anesthesia and close monitoring of anesthetic effects to ensure well being."[45] Studies indicate that performing surgery on unanesthetized fetuses results in automic

[43] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 30. Harrison, M.R.; Adzick, N.S.; Longuker, M.T.; Goldberg, J.D.; Rosen, M.A.; Filly, R.H.; Evans, M.I.; and Golbos, M.S. "Successful Repair in Utero of a Fetal Diaphragmatic Hernia After Removal of Herniated Viscera from the Left Thorax." *N Eng J Med* 322(1990): 1582-1584, at p. 1582. Strickland, R.A.; Oliver, W.C.; Chantigian, R.C.; Ney, J.A.; and Davidson, G.K. "Anesthesia, Cardiopulmonary Bypass, and the Pregnant Patient." *Mayo Clin Proc* 66(1991): 411-429, at pp. 414-415. Longaker, M.T.; Golbus, M.S.; Filly, R.A.; Rosen, M.A.; Chang, S.W.; and Harrison, M.R. "Maternal Outcome After Open Fetal Surgery." *JAMA* 265(1991): 737-741, at p. 737. Harrison, M.R.; Golbus, M.S.; Filly, R.A.; Anderson, R.L.; Flake, A.W.; Rosen, M.; and Huff, R.W. "Fetal Hydronephrosis: Selection and Surgical Repair." *J Pediatr Surg* 22(1987): 556-558, at p. 556. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176; Strickland, supra, at 411.

[44] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 27. See also, Strickland, supra, at p. 411.

[45] Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176.

nervous system stimulation, increased hormonal activity, increased motor activity, and variations in heart rate.[46] Anesthesia is used in fetal surgery on children as young as 18 weeks gestation.[47]

D. Non Myelinated Nerve Fibers Transmit Pain.

Until recently pain perception was presumed to require myelinated[48] nerve fibers[49] (present later in development). It has also been shown that this is not necessarily the case even in adults.[50] Both myelinated and unmyelinated nerve fibers transmit pain.[51] Most fibers of the nervous system of a newborn full term infant are not myelinated until two years after birth when the

[46] Levine, A.H. "Fetal Surgery." *Aorn J*, 54(1991): 17-19, 22-27, 30-32, at p. 27. Rosen, M. "Anesthesia and Monitoring for Fetal Intervention" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison 172-181. Philadelphia: W.B. Saunders Co., 1991, at p. 176.

[47] Harrison, M.; and Adzick, N.S. "The Fetus as a Patient." *Ann Sur* 213(1991): 279-291, at p. 281.

[48] Myelin is the fatty substance that makes up the sheath around many nerve fiber.

[49] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body*. Torstar Books, Inc., 1985, at p. 153.

[50] Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at p. 1322. Casey, K.L. "Neural Mechanisms of Pain: An Overview." *Acta Anaesthesiol Scand* Suppl 74(1982): 13-20, at 13.

[51] Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at 1322.

spinal cord, brainstem, and cerebellum are finally myelinated.[52] Myelin is not needed to conduct impulses over the nonmyelinated fibers, but the non-myelinated fibers conduct slower than myelinated ones (but in an infant who is physically smaller than an adult, the impulses do not have as far to travel.)[53] "Even when mature, most peripheral pain fibers are unmyelinated or, at best, thinly myelinated, lack of myelination therefore cannot be used as a valid argument to deny pain appreciation in the newborn."[54] A recent analysis of pain experiences in adults reached the conclusion that the classical view of the nervous system as a hard wired system projecting from nociceptors (pain detecting nerves) to the thalamus and then to the cortex cannot explain all pain experiences.[55]

[52] Clark, J., ed. "The Nervous System: Circuits of Communication." *The Human Body*. Torstar Books, Inc. (1985).

[53] Clark, J., ed. *The Nervous System: Circuits of Communication. The Human Body*. Torstar Books, Inc., 1985, p. 109.

[54] Scanlon, J.W.; "Appreciating Neonatal Pain." *Adv Pediatr* 38(1991): 317-[54]333, at p. 320.

[55] Wall, P.D. "The Biological Function and Dysfunction of Different Pain Mechanisms." In *Advances in Pain Research and Therapy*. Edited by F. Sicuteri, (10:19-28). New York: Raven Press, 1992, at p. 19.

E. It is Now Known that Full Cortical Development Is Not Necessary for the Child to Experience and Respond to Pain Prior to Birth.

Science no longer accepts the assumption that cortical involvement is necessary for pain detection.[56] Evidence to support the premise that pain can be experienced by children before 23 weeks gestation comes from the early detection of pain associated chemicals; the timing of nerve development; the observation of fetal behavior and the characterization of full term infants with anencephaly. The discovery of neuropeptides and their function as nerve impulse transmitters and modulators was totally unknown at the time of *Roe v. Wade* and is recognized as revolutionary.[57]

For the existence of pain there presumably has to be an event and detection of that event outside the brain region. It is a very important and recent observation, that, using immunohistochemistry techniques, substance "P" positive neurons and nerve fibers were detected at eleven weeks post fertilization,

[56] Boreus, L.O. "Pain in the Newborn - Pharmacodynamic Aspects." Dev. Pharmacol Ther 15(1990): 142-148, at p. 144. See also discussion at p. 71-73.

[57] See the discussion of the role of neuropeptides in pain transmission found in Petition at A-31 to A-33.

and enkephalin positive neurons and nerve fibers were detected at thirteen weeks post fertilization. The levels of substance "P" and enkephalin at twelve to fourteen weeks were comparable to levels of the full term baby. In 1990, as a result of this revelation using molecular biological techniques, researchers have stated that:

> "the importance of the early appearance of enkephalin and substance "P" neurons and fibers of the pain pathways in the major subnuclei connecting with the cardiovascular, gastrointestinal and respiratory functions in the human has to be stressed." [58]

None of the significant techniques used in the cited study were available in 1973 or significantly thereafter. Others have found Substance "P" present as early as five weeks gestation and has been detected at all stages of development wherever examined from that point thereafter.[59]

[58] Yew, D.T., et. al. *Development and Localization of Enkephalin and Substance P in the Nucleus of the Tractus Solitarius in the Medulla Oblongata of Human Fetuses,* Neuroscience 34(1990) p.491-498, at p. 491.

[59] Tam, P.K.; and Lister, J. "Maldevelopment of Spinal Cord - Substance P in Spina Bifida." *Z Kinderchir* 41(1986): 206-208. Wadhwa, S.; Rizvi, T.A.; and Bijiani, V. "Substance P-Immunoreactivity in the Developing Human Retinogeniculate Pathway." *Neurosci Lett* 89(1988): 25-30, at p. 25. Paulin, C.; Charnay, Y.; Chayvialle, J.A.; Daniere, S.; and Dubois, P.M. "Ontogeny of Substance P in the Digestive Tract, Spinal Cord and Hypothalamus of the Human Fetus." *Regul Pept* 14(1986): 145-153, at p. 145.

In the last six years modern science has examined the relationship of substance P and pain.[60] It has been found that substance "P" (a neuropeptide), an important excitatory transmitter of pain pathways, is clearly present in the human at five weeks post fertilization.[61] Nervous system development (and function) occurs well before 28 weeks gestation.

If a neocortex is needed for pain detection, then the fact that neocortex development begins at eight weeks gestation in the fetus and has all its neurons by twenty weeks is pertinent.[62] Some may assume that a degree of cortical maturity is necessary for pain perception. That assumption led physicians to presume that newborns did not feel pain when Roe v. Wade was decided. Clearly, that assumption was wrong.

[60] Uddman, R.; Edvinsson, L.; Jansen, I.; Stiernholm, P.; Jensen, K.; Olesen, J.; and Sunder, F. "Peptide-Containing Nerve Fibers in Human Extracranial Tissue: A Morphological Basis for Neuropeptide Involvement in Extracranial Pain?" *Pain* 27(1986): 391-399.

[61] Luo, C.B.; Zheng, D.R.; Guan, Y.L.; and Yew, D.T. "Localization of Substance P and Enkephalin by Immuno histochemistry in the Spinal Cord of the Human Fetus." *Neuroscience* 27(1988): 989-993, at p. 989.

[62] Marin-Padilla, M. "Structural Organization of the Human Cerebral Cortex Prior to the Appearance of the Cortical Plate." *Anat Embryol* 166(1983): 21-40, at p. 21.

Until recently, science was incapable of even formulating questions no less deriving answers concerning the role of chemicals in the transmission of pain. In fact, science had not even discovered the existence of most of those key chemicals when *Roe v. Wade* was determined. In the absence of knowledge concering pain transmitting chemicals those deciding upon what is needed for pain transmission requiree evidence for a physical structure such as dendritic spines to "determine" where pain transmission is possible. The presence of pain transmitting chemicals before the presence of such physicla structures makes pain transmission possible at an earlier gestational time. A recent review (1991) summarized the current state of understanding of the function and development of the brain in the developing human.[63]

[63] Lagercrantz, H.; and Forssberg, H. "Functional Development of the Brain in the Fetus and the Infant." *Lakartidningen* 88(1991): 1880-1885. "Neuronal multiplication occurs mainly from the tenth to twentieth gestational weeks, after which no new nerve cells are formed, though neuronal arborization and the information and reorganization of synapses continues until adulthood ...Somatosensory functions are developed at an early stage. The pain threshold is assumed to be lower in the fetus than in the adult. In man general fetal movements appear from the eighth gestational week and more complex movements such as sucking, swallowing and breathing during the tenth to twelfth gestational weeks. These movements are generated by neuronal networks." Lagercrantz, *supra*, 1991 at 1880-5.

Using modern techniques that were used to identify different types of nerve synapses, as well as different types of neurotransmitters, in samples taken from 8 to 37 week old fetus[64] it is concluded that the morphological substrate for nociception (pain detection) in the spinal cord exists at very early developmental stages in man. As early as the end of the 1st trimester, the thalamus, third ventricle, midbrain, brain stem, and cerebellar hemispheres are developed and their appearance, besides physical size, will go unchanged throughout the rest of fetal development.[65] Independently, others have also observed many of the important parts of the puzzle early on in development. At seven weeks gestation cutaneous sensory receptors appear in the fetus. This development is preceded by the development of synapses or junctions between sensory nerve fibers and interneurons of the spinal cord.[66] A basic sensory response loop is present extremely early in human development. It is noteworthy

[64] Rizvi, T.; Wadhwa, S.; and Bijiani, V. "Development of Spinal Substrate for Nociception" *Pain 4(1987-suppl.): S195.*

[65] Filly, R.A. "Sonographic Anatomy of the Noraml Fetus" In *The Unborn Patient* 2nd ed., edited by M.R. Harrison et al., 92-130, Philadelphia: W.B. Saunders Co., 1991, at p. 122.

[66] Anand, K.J.S.; and Hickey, P.R. "Pain and Its Effects in the Human Neonate and Fetus." *N Engl J Med* 317(1987): 1321-1329, at p. 1322.

that, with ultrasound, we can observe movement by the fetus away from outside stimulation by the eighth week.[67] Brain activity, as detected by electroencephalography, is also present at eight weeks gestation.[68] Nature in its wise way prepares the nervous system first so that all the other systems can develop and function as they should.[69] A basic sensory response loop is clearly present shortly after eight weeks gestation. This fact is scientifically logical since pain detection and response to pain are very important parts of a human's ability to survive.

It was recently discovered that many behaviors characteristic of newborns are clearly present in children with anencephaly (children born without a developed cortex).[70] Previously, these behaviors had erroneously been ascribed to cerebral hemispheric activity[71]

[67] Flower, M.J. "Neuromaturation of the Human Fetus." *J Med Philos* 10(1988): 237-351.

[68] Goldenring, J.M. "Development of the Fetal Brain." *N Engl J Med* 307(1982): 564, at p. 564; Flower, M.J., *supra*.

[69] Kalvger, G.; and Kalvger, M.F. Human Development: *The Span of Life*. St. Louis: The C.V. Mosby Company, 1974, at p. 35.

[70] The Medical Task Force on Anencephaly, (Stumpf, D.A., et al.) "The Infant with Anencephaly" *N Eng J Med* 322(1990): 669-674.

[71] Id.

(including activity described in the defendant's brief as needed for neocortical reception of body sensations).

Anencephalic children are born without a cerebral cortex.[72] Their expected post birth lifespan ranges from a few hours to a few months.[73] During their post birth lives these children breath spontaneously and have a grasp response.[74] They respond to noxious stimuli known to cause pain by avoidance, by withdrawal and by crying.[75] They breath, cough, hiccup, smile, grimace, yawn and suck. In a recent study of twelve anencephalic infants, all twelve responded to pain, all had an exaggerated sustained response to touch, all twelve evidenced spontaneous movement,

[72] Shewmon, D.A.; Capron, A.M.; Peacock, W.J.; and Schulman, B.L. "The Use of Anencephalic Infants as Organ Sources: A Critique." *JAMA* 261(1989): 1773-1781.

[73] Stumpf, D.A., Chair of Medical Task Force on Anencephaly "The Infant With Anencephaly." *N Eng J Med* 322(1990): 669-674.

[74] Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brian Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

[75] Stumpf, D.A., Chair of Medical Task Force on Anencephaly. "The Infant With Anencephaly." *N Eng J Med* 322(1990): 669-674. Shewman, D.A.; Capron, A.M.; Peacock, W.J.; and Schulman, B.L. "The Use of Anencephalic Infants as Organ Sources: A Critique." *JAMA* 261(1989): 1773-1781. Van Assche, F.A. "Anencephalics as Organ Donors." *Am J Obstet Gynecol* 163(1990): 599-600. Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brain Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

and all twelve breathed spontaneously.[76] Additionally, seven of the twelve responded to a stimulation at their mouth towards the stimulus (rooting response) and seven of the twelve had a sucking response.[77] Spontaneous movement in the fetus begins between six and seven and one-half weeks gestation.[78] Stimulation of the mouth area resulting in a response towards the stimulus is seen in the child at 9 weeks gestation and sucking is present at 11 weeks gestation.[79] Based upon these behaviors and their incidence in this study, one must conclude that the fetus at 6 to 11 weeks gestation is neurologically developed to a point at least equivalent to the twelve anencephalic children described above. They are all capable of experiencing pain.

In conclusion, the biochemical evidence, unforeseen and unavailable in 1973, supports the very early development of pain

[76] Ashwal, S.; Peabody, J.L.; Schneider, S.; Tomasi, L.G.; Emery, J.R.; and Peckham, N. "Anencephaly: Clinical Determination of Brain Death and Neuropathologic Studies." *Pediatr Neurol* 6(1990): 233-239.

[77] *Id.*

[78] de Vries, J.I.P.; Visser, G.H.A.; and Prechtl, H.F.R. "The Emergence of Fetal Behavior. I. Qualitative Aspects." *Early Hum Dev* 7(1982): 301-322. Flower, M.J. "Neomaturation of the Human Fetus." *J Med & Phil* 10(1985): 237-251.

[79] Flower, M.J. "Neomaturation of the Human Fetus." *J Med & Phil* 10(1985): 237-251.

detection in the fetus. This evidence is consistent with observed fetal behavior (using real time ultrasound), which shows the fetus moving away from painful stimuli at 8 weeks gestation. Modern instrumentation picks up brain wave activity also at 8 weeks gestation. Together these observations point to an active sensory system present and functioning in the fetus at 8 weeks gestation. Finally, the recent studies on full term anencephalic infants reveal these infants to be neurologically comparable to 6-11 week old fetuses. All of these infants are capable of experiencing pain.

CONCLUSION

There is a scientific consensus that a unique human life begins at conception. Scientific evidence, unavailable until very recently demonstrates that pain is experienced as early as eight weeks gestation. Abortion results in the painful death of a unique human being, whose life is irreplaceable.

Gil D. Messina

GIL D. MESSINA